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PIGGERY AND WASTE USE/DISPOSAL SYSTEM GUIDELINES

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INTRODUCTION

To meet the needs of American Samoa's rapidly growing population, land and water resources must he objective is to manage pig waste in an environmentally responsible manner, which protects ent, such as municipal sewers and ig waste and water, which reduces the public health and d roaches that ns that are found in pig waste. omposting pig waste requires: ant material, wood chips, or chipped coconut husks. be effectively managed. This includes pig waste management, which has gone largely unregulated in American Samoa. As a result, most piggeries implement inadequate waste management systems that contaminate surface water, which in turn contaminates our groundwater, drinking water, beaches and coral reefs. Local government laws require that all piggeries be located at least 50 feet from a dwelling or water body, and located at least 100 feet from a public water well. The law also requires that all pigs be kept in a pen, and that pig waste be properly treated in a manner that does not impact public health or the environment. All piggeries are considered "Major" projects by the ASG Department of Commerce, and must have a Land Use Permit. If a piggery cannot meet setback requirements or provide proper waste management, it must be closed permanently and the Land Use Permit will be denied.

The objective is to manage pig waste in an environmentally responsible manner which protects people from serious diseases such as: Leptospirosis, Gastroenteritis, Cholera, Dysentery, Infectious Hepatitis and Salmonellosis. Pathogens from pig waste can infect a person through the skin, eyes, mouth and nose. These pathogens often appear in our surface water (i.e. storm water, streams or water bodies) as a direct result of unsafe pig waste disposal practices.

PROPER PIG WASTE MANAGEMENT (COMPOST)

American Samoa has systems in place for human waste managem septic tank pumping trucks for onsite septic systems. Because pigs generate a more concentrated effluent than humans, these services do not exist for pig waste. For this reason, all three AS-EPA approved piggery designs include composting as a pig waste management technique.

Composting is important because:

1. It minimizes contact between p environmental hazards associated with pig waste contamination in our water.

2. It is a dry process, which reduces odors and wards off vermin such as flies an carry disease.
3. It kills pathogens that are found in pig waste.
4. Compost can be used as a fertilizer for plants.

Composting pig waste requires:

1. A carbon source, such as dry plant material, wood chips, or chipped coconut husks.
2. Ventilation, which includes periodic turning of the material during decomposition.
3. Time (approximately 60 days in American Samoa).

THREE APPROVED TYPES OF PIGGERIES

1. **Portable** - Composts pig waste into the ground.
2. **Dry Litter** - Composts pig waste into a trench/compost bin.
3. **Wash Down** - Uses a septic system for wastewater and a compost bin for solid waste.

COMMON FEATURES OF ALL APPROVED PIGGERIES:

• A Land Use Permit is required for all piggeries.
• All piggeries must have 100% roof coverage, including over any gutters and compost bins, to prevent rain water from contacting pig waste.
• The location of the piggery and waste disposal area shall have no storm water run-on or runoff and shall not be in a flood plain.
• The location of the piggery must be at least 50 feet from a human dwelling or water body, 10 feet from a property boundary line, and 100 feet from a public water well.
• All solid pig waste (manure) shall be composted.
• Piggeries shall use pig water nipples for animals to drink. This facilitates pig growth, keeps the pen dry, and conserves water. Water nipples can be purchased at Ace Hardware.
• A Conservation Plan is recommended from the USDA, Natural Resource Conservation Service (NRCS), Pago Plaza office.
• Planting a vegetative barrier such as vetiver grass (available at Land Grant & NRCS) around piggery is recommended for runoff and erosion control.

1. PORTABLE PIGGERY

A Portable piggery is a single pen built on the ground. Pig waste is composted in place, and the pen is moved on a regular basis. Standard portable piggery design drawings are available for free at AS-EPA.

• One 8-foot square pen shall accommodate no more than two full sized pigs at a time.
• On a daily basis, dry plant material such as leaves or mulch shall be placed in the pen, and especially on top of the pig waste. This absorbs moisture and reduces odor.
• One portable pen shall have a rotation area that is at least four times the size of the pen. This allows the native ground to recover while the pen is rotated.

• The pen must be rotated to a new location when composted material rises 12 inches above the original ground level. A final layer of dry plant material shall be added to the waste/compost to protect it from direct rainwater contact while it decomposes.
• The pen and rotation area shall be located on ground sloped 20% or less.
• The pen shall include a portable watering system with pig water nipples.
• The pen shall be constructed with hog panel wire sides or a similar barrier that allows for proper ventilation. Hog panels are available at Ace Hardware.
• The pen must be durable enough to withstand strong winds and contain large pigs. See the standard AS-EPA design for portable piggeries.
• Water shall never be used to clean the piggery, and pigs shall never be bathed inside the pen.

2. DRY LITTER PIGGERY

A Dry Litter piggery is a permanent structure that uses dry litter (dry plant material, such as wood chips or coconut husks) to absorb moisture and compost pig waste in the pen.

• The floor is concrete and sloped at least 5% to a concrete waste alley. The waste alley shall be at least 2' wide and 2' deep and sloped toward the compost bins.
• The pen walls shall be constructed with hog panels or a similar barrier to allow for ventilation. Solid brick walls are not permitted.
• On a daily basis, dry litter shall be added to each pen, and especially on top of any pig waste. The mixture of solid waste and dry litter works its way down-slope into the waste alley as a result of natural pig activity.
• After the mixture of solid waste and dry litter has accumulated in the waste alley, it must be shoveled into a compost bin to continue the composting process.
• Water shall never be used to clean the piggery and pigs shall never be bathed inside the pen. The pens may be cleared with a shovel as necessary.
• Information on Dry Litter piggery designs is available at NRCS.

Compost Bin

• The approximate size of the compost bin is 3' long by 3' wide by 3' tall. The bin can be made of wire, concrete, or wood, but must allow for proper ventilation.
• Compost bins should be placed under the piggery roof to keep compost dry and ventilated.
• During composting, the material should be turned or aerated at least twice a month, and is ready to use as fertilizer when it looks like dark soil. Typical composting time in American Samoa is approximately 60 days.
• A series of three bins is recommended to separate material at different stages of the composting process.
• More compost bin information is available at the NRCS.

Renovating Existing Piggeries into Dry Litter Systems

In some cases, an existing wash-down piggery may be converted to Dry Litter. In this case:

• All existing septic systems shall be decommissioned. This includes septic tanks or cesspools and all wastewater drains and gutters.

• Solid walls shall be replaced with hog panels or similar to allow for ventilation.
• A dry ventilated composting area shall be designated under the piggery roof. An existing pen could be converted to compost bins to serve this purpose.
• In the absence of sloped floors and a waste alley as described above, pigs may be temporarily moved to a spare pen after waste and dry litter has accumulated. The pen shall be cleaned by shoveling the waste material into a compost bin. Water shall never be used to clean the piggery.
• As necessary, uneven or cracked surfaces shall be repaired so that waste may be cleared with a flat shovel.
• Plumbing and pig nipples shall be installed for pigs to drink while keeping the pen dry.
• Proposed renovations must be submitted to AS-EPA for review in the form of engineering design drawings. In the case of minor renovations, a sketch of the piggery accompanied by an operation and maintenance plan may be substituted to serve as written confirmation of the applicant's commitment to proper pig waste management.
• A Land Use Permit must be obtained prior to any renovations.

3. WASH DOWN PIGGERY

A Wash Down piggery uses water to clean the pens daily. The waste management system is comprised of a solid waste separator, septic tank and drain field. This design depends on soil and water table characteristics and will not be feasible in all areas.

• The floor is concrete and sloped 3-5% to a waste gutter.
• The waste gutter is concrete and sloped 2 to 5% to a solid waste separator.
• Solids are retained in the solid waste separator, which is emptied regularly into a compost bin. Liquid wastewater from the solid waste separator then enters an appropriately sized septic tank and drain field for proper disposal.

Solid Waste Separator

The purpose of a solid waste separator is to protect the septic tank. Unlike household septic tanks that are pumped periodically to prevent overloading, piggery septic tanks have no available service for pumping and disposal. Additionally, piggeries generate a higher volume of solids than households, so piggery septic tanks fill much faster than residential septic tanks. There are various options for solid waste separators, from a screened scoop that is emptied after each washing, to filter bags that allow solids to compost in place before removal. The important thing is to keep solid waste (manure and pig hair) out of the septic tank.
• The solid waste separator shall be located under the piggery roof to prevent rainwater from entering the septic system.
• A screened solid waste separator must use wire mesh with openings no greater than a ¼ inch. This type of separator must be emptied into a compost bin after each piggery washing.
• A geotextile filter bag design requires two solid waste separators, so that one may dry out while the other in is use. These separators must be located under the piggery roof to allow for drying and proper ventilation.

Compost Bin
See compost bin specifications under "Dry Litter Piggery."

Septic Tank
• The piggery septic tank is for wastewater only and shall not accept solids or solid waste.
• The approved septic tank must be designed by a qualified engineer to hold the maximum amount of wastewater expected from the piggery over a 48-hour period.
• The septic tank must be watertight. Prefabricated septic tanks are recommended since castin-place septic tanks often crack, allowing waste to leak into the ground water.

Drain Field
• Three percolation tests by a qualified engineer at the location and depth of the drain field are required to determine the average percolation rate of the soil. Percolation test results must be submitted to AS-EPA with the piggery design for review.
• A qualified engineer shall design the drain field based on the piggery's expected wastewater flow, the determined average percolation rate, and AS-EPA approved percolation rate tables.
• The drain field can be constructed in trenches or beds, with infiltrators or perforated pipe, leveled and spaced at least 6 feet apart.
• Perforated pipe must be surrounded by gravel and covered by a filter material to prevent fill soil from clogging the pipe. At least 12 inches of gravel should be placed beneath each pipe.
• Trenches and beds must be at least 2 feet deep. Care must be taken not to smear the soil during excavation. Smearing will reduce the absorptive properties of the soil.
• Storm water runoff shall not flow onto the drain field site. Trenches and/or earth berms are effective for diverting storm water flow.

DESIGN ALTERNATIVES
• All design alternatives must be prepared by a qualified engineer and submitted to AS-EPA for review.
• Proposals for surface irrigation systems must be prepared by a qualified engineer under the advisement of NRCS. These systems require nutrient management plans, site-specific design work, and a location that does not expose the general public to contaminated irrigation water.
• Proposals for "traditional" open-air piggeries will be evaluated on a case-by-case basis. These systems require an NRCS-approved nutrient management plan, and a large flat contained area to allow pigs to graze. Due to the steep topography and widespread human development in American Samoa, traditional piggeries are rarely a viable design alternative.

ADDITIONAL ASSISTANCE
Government Agencies

• American Samoa Environmental Protection Agency (AS-EPA), Utulei, 633-2304
• Natural Resources Conservation Service (NRCS), Pago Plaza, 633-1031. NRCS provides Conservation Plans and has a program to help fund portions of new piggery Animal Waste Management System (AWMS).
• American Samoa Community College (ASCC) Land Grant, Malaeimi, 699-1575

Approved for distribution:

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